

[0033] FIG. 9 shows the media player of FIG. 7B being used by a user in accordance with one embodiment of the invention.

[0034] FIG. 10A is a flow diagram of user input processing according to one embodiment of the invention.

[0035] FIG. 10B is a flow diagram of user input processing according to another embodiment of the invention.

[0036] FIG. 11 is a flow diagram of user input processing according to another embodiment of the invention.

[0037] FIG. 12 is a block diagram of a rotary input display system in accordance with one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0038] The present invention relates to improved approaches for users of computing devices to interact with graphical user interfaces. A rotational user action supplied by a user via a user input device can provide accelerated scrolling. The accelerated nature of the scrolling enables users to scroll or traverse a lengthy data set (e.g., list of items) faster and with greater ease. The amount of acceleration provided can be performed in successive stages, and/or performed based on the speed of the rotational user action. In one embodiment, the rotational user action is transformed into linear action with respect to a graphical user interface. The resulting acceleration effect causes the linear action to be enhanced such that a lengthy data set is able to be rapidly traversed. Other aspects and features of the invention will become apparent below. Although the type of computing device can vary, the invention is particularly well-suited for use with a media player.

[0039] Embodiments of the invention are discussed below with reference to FIGS. 1-12. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

[0040] FIG. 1 is a flow diagram of scroll processing 100 according to one embodiment of the invention. The scroll processing 100 assists a user in scrolling through a data set. The scroll processing 100 initially receives 102 a number of units associated with a rotational user input. The number of units is an indication of an amount of rotational movement a user has invoked with respect to a rotational input device.

[0041] Next, an acceleration factor is determined 104. The acceleration factor is an indication of the degree of acceleration to be utilized with the scroll processing 100. After the acceleration factor is determined 104, the number of units that are associated with the rotational user input is modified 106 by the acceleration factor. In one embodiment, the number of units is modified by multiplication with the acceleration factor. In various other embodiments, the number of units can be modified in various other ways.

[0042] After the number of units has been modified 106, a next portion of the data set that is being scrolled through can be determined 108 based on the modified number of units. Once the next portion has been determined 108, the next portion of the data set can be presented 110. Typically, the next portion of the data set associated with the scroll processing 100 is presented 110 to the user that caused the

rotational user input. In one embodiment, the next portion of the data set can be presented 110 to the user by displaying the next portion of the data set on a display device. In another embodiment of the invention, the next portion of the data set can be presented 110 to the user by displaying the next portion of the data set with at least one item distinctively or distinguishably displayed (e.g., highlighted) from the other items. In still another embodiment, the next portion of the data set can be presented 110 to the user by playing or executing a file. After the next portion of the data set has been presented 110, the scroll processing 100 is complete and ends. However, the scroll processing 100 will repeat for each rotational user input.

[0043] Here, the faster the rate of rotational user input, the further down a list the next item becomes. It should be noted that the rate of rotational user input can be relative or absolute in nature. Still further, the rate of rotational user input need not be an actual velocity value, but could be a count or other value that is proportional to or influenced by the rate of rotational user input.

[0044] A data set as used herein pertains to a set of data. As one example, the data set can be a list of items (e.g., a list of songs). As another example, the data set can be a media file (e.g., MP3 or other audio file, video file, or image file). In one embodiment, the data set can be considered a sequential data set because the data within the set is often sequential. For example, the songs in a list are arranged sequentially and the data within an audio file are also arranged sequentially.

[0045] FIG. 2 is a flow diagram of list navigation processing 200 according to another embodiment of the invention. The list navigation processing 200 initially determines 202 a rate of rotational user input (e.g., dial turn). The rotational user input is provided through user interaction with a rotational input device. A list length is then obtained 204 and a current item in the list is identified. Typically, the current item is the item in the list that is being displayed. In one embodiment, the current item is highlighted such that it is distinctively displayed from other items of the list that are simultaneously displayed.

[0046] A next item in the list to be displayed is then determined 206 based on the rotational user input. The determination 206 of the next item in the list can also be dependent on the list length and the current item in the list. For example, the greater the rate of the rotational user input, the further apart the next item is from the current item in the list. The rate of the rotational user input and the length of the list can affect whether acceleration (e.g., acceleration factor) is provided for navigating the list. Thereafter, the list navigation processing 200 displays 208 a next item and one or more subsequent (or neighboring) items thereto. For example, the next item and the one or more subsequent items can be displayed 208 by a display screen produced by a display device. Additionally, the list navigation processing 200 can provide 210 an audio feedback. The audio feedback provides an audible sound that indicates feedback to the user as to the rate at which the items in the list are being traversed. The audible feedback can thus also be proportional to the rate of rotational user input.

[0047] FIG. 3 is a flow diagram of acceleration amount processing 300 according to one embodiment of the invention. The acceleration amount processing 300 is, for